

## Unit 1: Presentation 2

### Foundational Concepts and Overview of Key Steps

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## Session Goals

- Unpack the concept of vulnerability
- Emphasize the importance of defining goals based on user needs
- Review assessment design considerations
- Summarize key assessment steps

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## Key Steps for Undertaking a Vulnerability Assessment

1. Determine objectives and scope
2. Gather relevant data and expertise
3. Assess the components of vulnerability
4. Apply assessment results in adaptation planning




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## Steps 1 and 2

### 1. Determine objectives and scope

- Audience/user needs
- Goals and objectives
- Assessment targets (species, habitats, ecosystems)
- Scale (temporal and spatial)
- Appropriate approach (not one size fits all)

### 2. Gather relevant data and expertise

- Review existing literature
- Reach out to experts
- Obtain/develop climate and ecological response projections




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## Considerations

- Level of specificity and complexity also relate to objectives and type of decision processes
  - Most complex not always the “best”
  - Potential for “false accuracy” when projecting at scales finer than data can bear
- Project management triad (can only maximize two of the three)
  - Time
  - Cost
  - Quality




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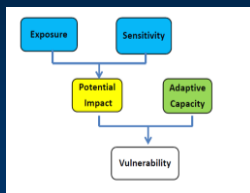
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## Step 3

### 3. Assess components of vulnerability

- Assess sensitivity, exposure, adaptive capacity
- Estimate overall vulnerability
- Document confidence levels/uncertainties




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## Sensitivity

Measure of whether and how a species or system is likely to be affected by a given change in climate



- **Sunburn example:**

- Amount of melanin in skin is key physiological factor
- Melanin absorbs UV rays, which cause sunburn
- Skin with lower melanin levels is more sensitive to sunburn

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## Exposure

Measure of how much of a change in climate or other environmental factor a species or system is likely to experience

- **Sunburn example:**

- The amount of UV rays determines exposure
- Strength of rays depends on latitude, season & weather
- With enough exposure, most anybody can burn




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## Adaptive Capacity

Ability to accommodate or cope with climate change impacts with minimal disruption

- **Sunburn example:**

- Can be intrinsic (reduce sensitivity) or extrinsic (reduce exposure)
- For sunburn, extrinsic adaptations include sunblock, protective clothes, shelter
- Intrinsic adaptations include UV-induced increase in melanin production (i.e., tanning)




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## Putting the Pieces Together



- **Detailed modeling efforts**
  - In-house or commissioned
- **Vulnerability indices**
  - e.g., NatureServe Index
- **Expert elicitation**
  - Supplement and/or supplant modeling

## Addressing Uncertainty in Vulnerability Assessments

- **Natural resource management has always faced uncertainty**
  - Anxiety about uncertainty often leads to “analysis paralysis”
  - Don’t deny it, embrace it
- **Three types of uncertainty**
  - Climate predictions
  - Ecological responses
  - Management effectiveness
- **Distinguish between uncertainty in trend vs. rate and magnitude**



Likelihood Scale	
Terminology	Likelihood of the Occurrence/Outcome
Virtually certain	>99 percent probability of occurrence
Very likely	>90 percent probability
Likely	>66 percent probability
About as likely as not	50 to 66 percent probability
Unlikely	<33 percent probability
Very unlikely	<10 percent probability
Exceptionally unlikely	<1 percent probability

## Step 4

### 4. Apply assessment results in adaptation planning

- **Reduce sensitivity**
  - e.g., actively plant drought-tolerant species in area projected to get drier
- **Reduce exposure**
  - e.g., identify and protect cold-water refugia
- **Enhance adaptive capacity**
  - e.g., remove coastal armoring to facilitate habitat migration inland in response to sea-level rise



Using Assessment Results:  
An Example

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